



**stratos**  
Control Systems Ltd.

# OPERATOR SAFETY & HUMAN FACTORS ASSESSMENT TOOLKIT

Evaluate, identify and reduce operator risks through better automation system design.



## PROTECT PEOPLE

Identify design issues that increase operator risk and human error.



## IMPROVE USABILITY

Evaluate HMI, controls and workflows to make systems clear and intuitive.



## REDUCE INCIDENTS

Address hidden risks before they lead to incidents, near misses or downtime.



## DRIVE PERFORMANCE

Better design leads to safer operations, faster response and higher productivity.



## 7 PRACTICAL ASSESSMENT TEMPLATES INSIDE

Everything you need to assess operator safety and improve human factors in your systems.



**SAFER SYSTEMS.  
STRONGER OPERATIONS.**



**FOR OPERATORS.  
BY ENGINEERS.**



**PRACTICAL TOOLS.  
REAL IMPACT.**



**ASSESS. IMPROVE.  
PROTECT.**

A well-designed operator interface reduces risk, improves response time and helps prevent operator error. Use this checklist to evaluate the usability, clarity and effectiveness of your HMI and operator controls.



### PURPOSE

Identify design issues that may increase operator risk and affect safe, efficient operation.

Company / Site: \_\_\_\_\_ Panel / System ID: \_\_\_\_\_ Date: \_\_\_\_\_  
Equipment / Area: \_\_\_\_\_ Inspector: \_\_\_\_\_ Review Date: \_\_\_\_\_

AREA	CHECKPOINT	GUIDANCE	RATING (1-5)					N/A
			1 = Poor	2	3	4	5 = Excellent	
 <b>VISIBILITY &amp; LAYOUT</b>	1. Critical information is easy to see	Alarms, status and key process values are clearly visible at a glance.	1	2	3	4	5	<input type="checkbox"/>
	2. Key data is displayed on the main screen	Operators do not need to navigate multiple screens to find critical information.	1	2	3	4	5	<input type="checkbox"/>
	3. Screen layout is consistent across all HMIs	Similar graphics, colours and structures are used throughout the system.	1	2	3	4	5	<input type="checkbox"/>
	4. Important controls are easy to locate	Frequently used buttons and controls are logically placed and accessible.	1	2	3	4	5	<input type="checkbox"/>
 <b>NAVIGATION &amp; USABILITY</b>	5. Navigation between screens is intuitive	Screen flow is logical and consistent with operator expectations.	1	2	3	4	5	<input type="checkbox"/>
	6. Screen buttons and icons are self-explanatory	Icons and abbreviations are standard, simple and easy to understand.	1	2	3	4	5	<input type="checkbox"/>
	7. Text, labels and units are clear	Information is clearly labelled with appropriate units of measure.	1	2	3	4	5	<input type="checkbox"/>
	8. Operators can complete tasks efficiently	The interface supports quick and accurate task completion.	1	2	3	4	5	<input type="checkbox"/>
 <b>ALARM MANAGEMENT</b>	9. Alarms are prioritised by severity	High priority alarms are clearly distinguished from low priority.	1	2	3	4	5	<input type="checkbox"/>
	10. Alarm messages are clear and actionable	Alarm text describes the issue and suggests the required action.	1	2	3	4	5	<input type="checkbox"/>
	11. Alarm summary is easy to access	Operators can quickly view and acknowledge active alarms.	1	2	3	4	5	<input type="checkbox"/>
	12. Alarm flood / nuisance alarms are minimised	System prevents alarm flooding and repeated false alarms.	1	2	3	4	5	<input type="checkbox"/>
 <b>OPERATOR CONTROL &amp; FEEDBACK</b>	13. Control actions require confirmation	Critical actions (e.g. start/stop/reset) require confirmation to prevent errors.	1	2	3	4	5	<input type="checkbox"/>
	14. System provides feedback for operator actions	Operators receive clear confirmation after an action is completed.	1	2	3	4	5	<input type="checkbox"/>
	15. Interlocks and safeguards are clearly indicated	Active interlocks and protections are clearly shown to the operator.	1	2	3	4	5	<input type="checkbox"/>
	16. Status indicators are accurate and up to date	Indicators reflect real-time system status without delay.	1	2	3	4	5	<input type="checkbox"/>
 <b>EMERGENCY &amp; SAFETY INFORMATION</b>	17. Emergency stop and safety controls are visible	E-stops and safety actions are clearly identified and never hidden.	1	2	3	4	5	<input type="checkbox"/>
	18. Safety messages and warnings are clear	Warnings are easy to understand and stand out visually.	1	2	3	4	5	<input type="checkbox"/>
	19. Safe operating limits are displayed	Operators can easily see safe operating ranges and limits.	1	2	3	4	5	<input type="checkbox"/>
	20. Emergency procedures are accessible	Key procedures and guidance are accessible when required.	1	2	3	4	5	<input type="checkbox"/>

### OVERALL HMI USABILITY SCORE (OUT OF 100)

Total your score (1-5 per item = 20 items x 5 = 100)

/100

### SCORE GUIDE

80 - 100		Excellent - Well designed and user friendly
60 - 79		Good - Minor improvements recommended
40 - 59		Fair - Improvements needed
0 - 39		Poor - Significant redesign required

### NOTES / OBSERVATIONS

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Ensure control panels and operator stations are designed for safe, comfortable and efficient use. Assess access, reach, viewing angles and working clearances to identify ergonomic and safety risks.



### PURPOSE

Evaluate physical access, reach and viewing conditions to reduce operator strain, errors and risk of injury.

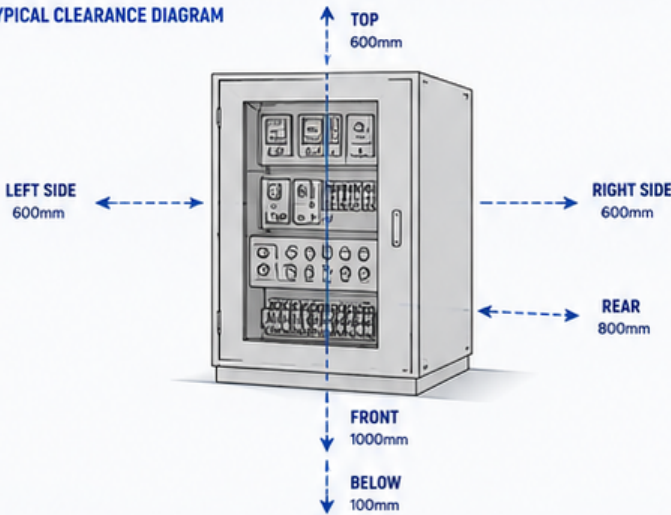
Company / Site: \_\_\_\_\_ Inspector: \_\_\_\_\_ Review Date: \_\_\_\_\_  
 Panel / System ID: \_\_\_\_\_ Position / Role: \_\_\_\_\_ Shift Observed:  Day  Night  Both  
 Equipment / Area: \_\_\_\_\_ Date: \_\_\_\_\_ Observer(s): \_\_\_\_\_

### 1. WORKING CLEARANCE ASSESSMENT

LOCATION	RECOMMENDED MINIMUM CLEARANCE*	ACTUAL CLEARANCE	COMPLIANT (Y / N)	COMMENTS
Front of Panel	1000 mm		Y / N	
Rear of Panel	800 mm		Y / N	
Left Side	600 mm		Y / N	
Right Side	600 mm		Y / N	
Top of Panel	600 mm		Y / N	
Below Panel	100 mm		Y / N	

\*Recommended clearances based on IEC 60204-1 and BS EN 61439-1

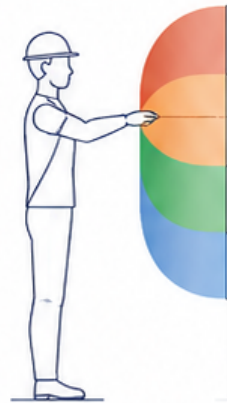
#### TYPICAL CLEARANCE DIAGRAM



#### Adequate clearances are essential for:

- ✓ Safe access and maintenance
- ✓ Heat dissipation and ventilation
- ✓ Reduced injury risk
- ✓ Compliance with standards

### 2. OPERATOR REACH ASSESSMENT



CHECK EACH ITEM	Y / N
Frequently used controls are within comfort zone	Y / N
Emergency stop is easily reachable	Y / N
Isolation switches are within safe reach	Y / N
Displays are within comfortable viewing range	Y / N
Heavy or forceful controls are within safe reach	Y / N

#### COMMENTS

### 3. VIEWING ASSESSMENT

ITEM	IDEAL CRITERIA	Y / N	COMMENTS
HMI / Screen Height	Top of screen at or below eye level	Y / N	
Viewing Angle	Between 15° below and 30° above eye level	Y / N	
Screen Glare	No glare from lighting or windows	Y / N	
Text / Font Size	Clear and legible from normal operating distance	Y / N	
Indicator Visibility	LEDs / indicators clearly visible from position	Y / N	

### 4. ACCESS FEATURES CHECKLIST

CHECK THE FOLLOWING	YES	NO	N/A	COMMENTS
Panel doors open fully and are secure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Door handles and locks easy to operate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Internal components are easily accessible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wire ducts and components do not obstruct access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Adequate lighting inside panel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Space available for safe tool use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
No sharp edges or pinch points present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

#### NOTES / OBSERVATIONS

### 5. ERGONOMICS RISK SUMMARY

OVERALL RISK RATING	DESCRIPTION	OVERALL RISK RATING (TICK ONE)
<span style="color: red;">●</span> HIGH	Significant ergonomic risks identified. Immediate improvement required.	<input type="checkbox"/> HIGH
<span style="color: orange;">●</span> MEDIUM	Some ergonomic risks identified. Improvements recommended.	<input type="checkbox"/> MEDIUM
<span style="color: green;">●</span> LOW	Ergonomics are generally acceptable. Minor improvements may be beneficial.	<input type="checkbox"/> LOW

#### KEY ISSUES IDENTIFIED

INSPECTOR SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

REVIEWED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

Evaluate common operator tasks to identify design-related risks that may lead to error, delay or injury.



### PURPOSE

Assess the ease, clarity and safety of operator tasks. Identify high-risk tasks and opportunities to improve system design and usability.

Company / Site: \_\_\_\_\_ Inspector: \_\_\_\_\_ Review Date: \_\_\_\_\_

Panel / System ID: \_\_\_\_\_ Position / Role: \_\_\_\_\_ Shift Observed:  Day  Night  Both

Equipment / Area: \_\_\_\_\_ Date: \_\_\_\_\_ Observers: \_\_\_\_\_

## 1. OPERATOR TASK ASSESSMENT

TASK	TASK DESCRIPTION	FREQUENCY (H / D / W / M)	EASE OF COMPLETION (1-5)	RISK LEVEL (LOW / MED / HIGH)	POTENTIAL CONSEQUENCE (IF TASK DONE INCORRECTLY)	NOTES / IMPROVEMENTS REQUIRED
START-UP	Starting the system or production line.		1 2 3 4 5	<input type="radio"/> LOW <input type="radio"/> MEDIUM <input type="radio"/> HIGH		
SHUTDOWN	Normal shutdown of system or equipment.		1 2 3 4 5	<input type="radio"/> LOW <input type="radio"/> MEDIUM <input type="radio"/> HIGH		
FAULT RESET	Resetting alarms or clearing faults.		1 2 3 4 5	<input type="radio"/> LOW <input type="radio"/> MEDIUM <input type="radio"/> HIGH		
PRODUCT CHANGEOVER	Changing recipes, settings or product parameters.		1 2 3 4 5	<input type="radio"/> LOW <input type="radio"/> MEDIUM <input type="radio"/> HIGH		
MANUAL OPERATION	Operating in manual mode or local controls.		1 2 3 4 5	<input type="radio"/> LOW <input type="radio"/> MEDIUM <input type="radio"/> HIGH		
MAINTENANCE MODE	Placing system in maintenance / test mode.		1 2 3 4 5	<input type="radio"/> LOW <input type="radio"/> MEDIUM <input type="radio"/> HIGH		
OTHER TASK (SPECIFY)	_____		1 2 3 4 5	<input type="radio"/> LOW <input type="radio"/> MEDIUM <input type="radio"/> HIGH		

**EASE OF COMPLETION (1-5)**

1 = Very Difficult    2 = Difficult  
 3 = Moderate        4 = Easy  
 5 = Very Easy

**RISK LEVEL GUIDE**

**LOW** – Unlikely to cause injury or major operational impact.  
**MEDIUM** – Could cause injury, delay or minor equipment damage.  
**HIGH** – Likely to cause injury, major downtime or significant damage.

**OVERALL TASK RISK SUMMARY**

Overall risk level based on highest risk identified:

(Tick one)     LOW     MEDIUM     HIGH

## 2. TASK DIFFICULTY FACTORS

FACTOR	Y / N	COMMENTS
Task requires information not visible from operating position	Y / N	
Multiple steps or screens required	Y / N	
Unclear instructions or labelling	Y / N	
Time pressure to complete task	Y / N	
Requires knowledge not easily accessible	Y / N	
Risk of selecting wrong control	Y / N	
Poor feedback or confirmation	Y / N	
Physical effort required (reaching, bending, etc.)	Y / N	

**ADDITIONAL COMMENTS**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 3. HIGH-RISK TASKS IDENTIFIED

TASK	WHY IT IS HIGH RISK	POTENTIAL IMPROVEMENTS

## 4. OBSERVATION NOTES

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Capture near miss incidents and operator feedback to identify design issues and opportunities for improvement.



## PURPOSE

Record near miss incidents and gather operator feedback to identify risks, reduce recurrence and improve system design and usability.

Company / Site: \_\_\_\_\_ Completed By: \_\_\_\_\_ Review Date: \_\_\_\_\_  
 Panel / System ID: \_\_\_\_\_ Position / Role: \_\_\_\_\_ Shift Observed:  Day  Night  Both  
 Area / Department: \_\_\_\_\_ Date Completed: \_\_\_\_\_ Observers: \_\_\_\_\_

## 1. NEAR MISS INCIDENT LOG

DATE & TIME	DESCRIPTION OF NEAR MISS (WHAT HAPPENED?)	CONTRIBUTING FACTORS (WHY DID IT HAPPEN?)	DESIGN ISSUE? (Y / N)	POTENTIAL SEVERITY (LOW / MED / HIGH)	ACTION TAKEN (IMMEDIATE RESPONSE)	FOLLOW UP REQUIRED? (Y / N)
			Y / N	LOW / MED / HIGH		Y / N
			Y / N	LOW / MED / HIGH		Y / N
			Y / N	LOW / MED / HIGH		Y / N
			Y / N	LOW / MED / HIGH		Y / N

## 2. OPERATOR FEEDBACK

Gather feedback from operators and key users about their experience with the system.

FEEDBACK AREA	QUESTION	OPERATOR RATING (1-5) 1 = Poor 5 = Excellent	COMMENTS / SUGGESTIONS
 VISIBILITY & INFORMATION	How easy is it to see important information when you need it?	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
 ALARMS & ALERTS	Are alarms clear, helpful and not overwhelming?	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
 CONTROLS & INTERACTION	Are controls easy to reach, understand and operate?	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
 TASK EFFICIENCY	Can you complete your tasks using the system efficiently?	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
 OVERALL SATISFACTION	Overall, how would you rate your experience using this system?	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	

What is the most frustrating or difficult part of using the system? \_\_\_\_\_

What improvements would make your job easier and safer? \_\_\_\_\_

## 3. DESIGN RISK SUMMARY

### RISK RATING GUIDE

HIGH	Could result in serious injury, significant downtime or major environmental impact.
MEDIUM	Could result in minor injury, operational disruption or reduced performance.
LOW	Unlikely to cause injury or significant operational impact.

### OVERALL RISK RATING (TICK ONE)

- HIGH  
 MEDIUM  
 LOW

### SUMMARY OF KEY ISSUES IDENTIFIED:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## 4. ROOT CAUSE INDICATORS

Tick all contributing factors that apply to the near miss or design issue.

- |   |  |
|---|--|
| <input type="checkbox"/> Poor visibility of information   | <input type="checkbox"/> Insufficient training or awareness  |
| <input type="checkbox"/> Unclear or confusing HMI design  | <input type="checkbox"/> Inadequate documentation            |
| <input type="checkbox"/> Poor alarm management            | <input type="checkbox"/> Complicated or inefficient workflow |
| <input type="checkbox"/> Controls difficult to reach      | <input type="checkbox"/> System latency or slow response     |
| <input type="checkbox"/> Inadequate lighting              | <input type="checkbox"/> Poor labelling or identification    |
| <input type="checkbox"/> Lack of feedback or confirmation | <input type="checkbox"/> Other (please specify) _____        |

## 5. ACTIONS & FOLLOW UP

ACTION REQUIRED	RESPONSIBLE PERSON	TARGET DATE	STATUS (Open / In Progress / Closed)

REVIEWED BY: \_\_\_\_\_ POSITION: \_\_\_\_\_ SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_



# 7 OPERATOR SAFETY IMPROVEMENT ACTION PLAN

Use this plan to prioritise and track improvements identified during the assessment to reduce operator risk and improve system usability.



## PURPOSE

Create a clear plan to address identified risks, improve human factors, and enhance operator safety and system performance.

Company / Site: \_\_\_\_\_ Completed By: \_\_\_\_\_ Review Date: \_\_\_\_\_

Panel / System ID: \_\_\_\_\_ Position / Role: \_\_\_\_\_ Implementation Priority:  High  Medium  Low

Area / Department: \_\_\_\_\_ Date Completed: \_\_\_\_\_ Approved By: \_\_\_\_\_

## 1. IMPROVEMENT ACTION PLAN

PRIORITY	ISSUE IDENTIFIED (FROM ASSESSMENT)	RISK (LOW / MED / HIGH)	RECOMMENDED ACTION / IMPROVEMENT	BENEFIT / OUTCOME	RESPONSIBLE PERSON	TARGET DATE	STATUS (Open / In Progress / Completed)
! HIGH		L M H					
! HIGH		L M H					
! HIGH		L M H					
! MEDIUM		L M H					
! MEDIUM		L M H					
! LOW		L M H					
! LOW		L M H					

## 2. QUICK WINS (ACTIONS TO IMPLEMENT IMMEDIATELY)

ACTION	COMPLETED?
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

NOTES / ADDITIONAL COMMENTS

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 3. MEASURING IMPROVEMENT

MEASURE	CURRENT (BASELINE)	TARGET	REVIEW DATE	ACTUAL (ACHIEVED)
Operator incidents (per month)				
Fault response time (average)				
Operator task time (average)				
Operator satisfaction (rating 1-5)				
Unsafe act / near miss reports				

### REVIEW & CONTINUOUS IMPROVEMENT

Regularly review this action plan to ensure improvements are delivered, risks are reduced and operator safety is enhanced.



## 4. VERIFICATION & SIGN-OFF

Have all high and medium priority actions been addressed or scheduled?  Yes  No If no, provide reason: \_\_\_\_\_

Prepared By: \_\_\_\_\_ Position: \_\_\_\_\_ Date: \_\_\_\_\_

Reviewed By: \_\_\_\_\_ Position: \_\_\_\_\_ Date: \_\_\_\_\_

Approved By: \_\_\_\_\_ Position: \_\_\_\_\_ Date: \_\_\_\_\_